What is claimed is:

1. A catalytic combustor system for a turbine engine comprising:

at least one pilot nozzle providing a first flow exiting the pilot nozzle;

at least one catalytic module providing a second flow exiting the plurality of catalytic modules, wherein at least a portion of the second flow is substantially adjacent to at least a portion of the first flow; and

at least one vortex forming device positioned substantially within the path of the second flow, wherein at least one vortex is formed in at least a portion of the second flow,

whereby at least a portion of the first flow mixes with at least a portion of the second flow.

2. The system of claim 1 wherein at least one catalytic module substantially peripherally surrounds the pilot nozzle.

3. The system of claim 1 wherein at least one pilot nozzle substantially peripherally surrounds the catalytic module.

4. The system of claim 1 wherein the at least one vortex forming device is one of mixers, swirlers or vortex generators.

5. The system of claim 1 wherein the at least one vortex forming device is positioned substantially adjacent to the exit of the at least one catalytic module.

6. The system of claim 1 wherein the at least one vortex forming device is positioned downstream of the at least one catalytic module.

7. The system of claim 1 wherein the at least one vortex forming device includes a plurality of surfaces, wherein each of the surfaces is substantially oblique to the path of the second flow.

8. The system of claim 1 wherein the second flow is substantially laminar prior to encountering the vortex forming device.

9. The system of claim 1 wherein the first flow is at least partially reacted and the second flow is partially reacted.

10. The system of claim 1 including at least two vortex formation devices, wherein the at least two vortex formation devices are different from each other, whereby the combustion flame is shaped based on the vortex formation devices selected.

11. A method for reducing CO emissions in a catalytic combustor for a turbine engine comprising the steps of:

providing a turbine engine having a catalytic combustor system, wherein the catalytic combustor includes at least one pilot nozzle and at least one catalytic module;

passing a first mixture of fuel and air through the at least one catalytic module such that a catalyst is introduced to the first mixture, the catalyst commencing a combustion reaction with the mixture, wherein the flow exiting each of the catalytic modules forms a catalytic flow stream having a catalytic temperature;

passing a second mixture of fuel and air through the pilot nozzle such that at least a portion of the second mixture is ignited, wherein the flow exiting the pilot nozzle forms a pilot flow stream having a pilot temperature, wherein the pilot temperature is greater than the catalytic temperature;

ducting the pilot flow stream and the catalytic flow stream away from the at least one pilot nozzle and the at least one catalytic module, wherein the pilot flow stream and the catalytic flow stream remain substantially unmixed; and

creating at least one vortex in at least a portion of the catalytic flow stream, wherein the at least one vortex in the catalytic flow stream causes at least a portion of the pilot flow stream to mix with at least a portion of the catalytic flow stream,

whereby the hotter pilot flow stream accelerates the burnout reaction in the catalytic flow stream and further shortens the combustion flame length so as to reduce carbon monoxide emissions from the turbine engine.

12. The method of claim 11 wherein the at least one vortex is created by one of vortex generators, mixers, or swirlers.

13. The method of claim 11 wherein the at least one vortex is created by providing at least one vortex forming device positioned substantially within the catalytic flow stream.

14. The method of claim 13 wherein the at least one vortex forming device is provided substantially at the exit of at least one of the catalytic modules.

15. The method of claim 11 wherein the catalytic flow stream is partially reacted when it mixes with at least a portion of the pilot flow stream.

16. The method of claim 11 wherein the pilot flow stream is at least partially reacted when it mixes with at least a portion of the catalytic flow stream.

17. The method of claim 11 wherein the step of creating at least one vortex includes imparting bulk motion into the catalytic flow stream.

18. The method of claim 11 wherein at least a first vortex and a second vortex are formed within the catalytic flow stream, the first vortex being substantially different from the second vortex, whereby the vortices can be used to selectively shape the combustion flame.

19. The method of claim 11 wherein the catalytic flow stream substantially peripherally surrounds the pilot flow stream.

20. A catalytic combustion method for a turbine engine comprising the steps of:

providing a substantially laminar catalytic flow stream at a catalytic temperature, wherein the catalytic flow stream is partially reacted by a catalyst in the catalytic flow stream;

providing at least a partially reacted pilot flow stream at a pilot temperature, the pilot temperature being greater than the catalytic temperature, at least a portion

of the pilot flow stream traveling substantially adjacent to at least a portion of the catalytic flow stream, wherein the catalytic and pilot flow streams remain substantially unmixed; and

generating secondary motion in at least a portion of the catalytic flow stream such that at least a portion of the catalytic flow stream mixes with at least a portion of the pilot flow stream,

whereby the hotter pilot flow stream accelerates the burnout reaction in the catalytic flow stream and further shortens the combustion flame length so as to reduce carbon monoxide emissions from the turbine engine.